ZZZZ337 – Checking of INFO_MODE and of CALC_MODES+OPTION=' BANDE' parallels

Summary:

This test does not validate new modeling. It is gauged to function on 1 (modeling b) and 4 processors (modeling a).
It is about a data-processing and functional test of the various levels of parallelism available in the operators INFO_MODE and CALC_MODES+OPTION=' BANDE' with cutting in sub-bands.
The sequential version (modeling b) serves as reference.

1 Problem of reference

This test is copied on the first calculation CALC_MODES+OPTION=' BANDE' CAS-test fdlv112b ($N=5229$ degrees of freedom). One seeks 50 modes into 2.3 or 4 sub-bands according to the cases. One pre-gauges, each modal research, by calls to INFO_MODE parallel.

This test is dedicated to the data-processing and functional validation of the parallel diagrams of calculations of CALC_MODES+OPTION=' BANDE' with cutting in sub-bands, and of INFO_MODE.
One tests the validity of a good amount of possible parallel configurations while playing on:

- Levels of activated parallelism (S) (if modeling a),
- The distribution of processes MPI by sub-bands (if modeling a),
- The criterion of post-checking of Sturm (if CALC_MODES),
- The combinative one of the digital parameters (modal solveurs and/or direct linear solveurs).

Calculation is launched on 4 processors (if modeling a) and 1 processor (if modeling b).

Thus, calculations suggested are:

With potentially 2 levels of parallelism [1] (NIVEAU_PARALLELISME=' COMPLET'):

- if many processors < many nonempty sub-bands : case treated in the CAS-test erreu015a; Stop in ERREUR_F MODAL_10 some are the values of the other parameters.
- if many processors = many nonempty sub-bands : here 4 processors and 4 sub-bands. Parallel calculation called "4x1[2] ". A calculation INFO_MODE and 3 calculations CALC_MODES+ MUMPS, with the modal solvor by default, by varying the values of the test of Sturm ('LOCAL' GLOBAL'//'NOT'). Concepts users nbmd41 and mode41, mode41l and mode41n.
  Idem by blending the linear solvor ('MULT_FRONT'and'LDLT'), the criterion of Sturm and the modal solvor ('JACOBI' and 'TRI_DIAG'). Concepts users nbmdMF/nbmdLDLT and modeSM/modeLM/modeJM.
- if many nonempty processors = alpha*nombre of sub-bands (alpha entier>1) : here 4 processors and 2 sub-bands (alpha=2).
  If the direct solvor is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F MODAL_9/10. And this, some are the values of the other parameters.
  If the direct solvor is MUMPS: parallelism known as "2x2 [3] ". A calculation INFO_MODE and 3 calculations CALC_MODES , with the modal solvor by default, by varying the values of the test of Sturm (' 'LOCAL' GLOBAL'//'NOT') . Concepts users nbmd22 and mode22 , mode22l and mode22n .
- if many processors > alpha*nombre of sub-bands not vides+1 (alpha entier>1) : here 4 processors and 3 sub-bands (alpha=1).
  If the direct solvor is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F MODAL_9/10. And this, some are the values of the other parameters.
  If the direct solvor is MUMPS: parallelism known as "1x2 + 2 (1x1) [4] ". A calculation INFO_MODE and 3 calculations CALC_MODES by varying the values of the test of Sturm (' 'LOCAL' GLOBAL'//'NOT') with the modal solvor by default. Concepts users nbmd211 and mode211 , mode211l and mode211n .

With potentially 1 level of parallelism [5] (NIVEAU_PARALLELISME=' PARTIEL'):

- if many processors < many nonempty sub-bands : here 4 processors and 5 sub-bands.
  If the direct solvor is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F MODAL_14. And this, some are the values of the other parameters.

1 One on the level of the sub-bands, supplemented, if it there is enough process MPI, by a second on the level of the linear solvor (if this one is MUMPS).
2 Each sub-band was seen reserving its dedicated processor.
3 Each sub-band was seen reserving its dedicated group of 2 processors.
4 The first sub-band is treated on 2 processors, then each following sub-band is treated by a different processor.
5 Only the second level of the linear solvor (if this one is MUMPS).

If the direct solvor is MUMPS: parallelism says "5 (1x4) [6] ". A calculation INFO_MODE and 3 calculations CALC_MODES , with the modal solvor by default, by varying the values of the test of Sturm (' 'LOCAL' GLOBAL'//'NOT') . Concepts users nbmd15 and mode15 , mode15l and mode15n .

- if many processors = many nonempty sub-bands : here 4 processors and 4 sub-bands.
  If the direct solvor is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F MODAL_14. And this, some are the values of the other parameters.
  If the direct solvor is MUMPS: Calcul parallel said "4 (1x4)[7] ". A calculation INFO_MODE and 3 calculations CALC_MODES+MUMPS, with the modal solvor by default, by varying the values of the test of Sturm ('LOCAL' GLOBAL'//'NOT'). Concepts users nbmd14 and mode14, mode14l and mode14n.
- if many nonempty processors > alpha*nombre of sub-bands (alpha entier>1):
  Without object.
- if many processors > alpha*nombre of sub-bands not vides+1 (alpha entier>1): here 4 processors and 3 sub-bands (alpha=1).
  If the direct solvor is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F MODAL_14. And this, some are the values of the other parameters.
  If the direct solvor is MUMPS: parallelism says "3 (1x4) [8] ". A calculation INFO_MODE and 3 calculations CALC_MODES by varying the values of the test of Sturm (' 'LOCAL' GLOBAL'//'NOT') with the modal solvor by default. Concepts users nbmd13 and mode13 , mode13l and mode13n .

For each calculation CALC_MODES, one tests 8 values of not-regression of mode_meca:

- 4 eigenvalues catches at the boundaries of the subintervals[2,]
- 4 values of the unit effective modal mass taken arbitrarily, by permuting the components.

For each calculation INFO_MODE parallels, one tests 3 values of not-regression of the components 'NB_MODE' sd_table:

- the minimal value,
- the maximum value,
- the sum.

6 The 5 sub-bands are treated the ones after the others (by order ascending) and, each time, one devotes 4 processors to it.

7 The 4 sub-bands are treated the ones after the others (by order ascending) and, each time, one devotes 4 processors to it.

8 The 3 sub-bands are treated the ones after the others (by order ascending) and, each time, one devotes 4 processors to it.